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XXXI. *An Account of Elden Hole in Derbyshire; By J. Lloyd, Esq; with some Observations upon it, by Edward King, Esq; F. R. S.; in a Letter to Matthew Maty, M. D. Sec. R. S.*

To Edward King, Esq;

Dear Sir,

Read Feb. 21, 1771. **T**HE inclosed is some account of Elden Hole, in Derbyshire; with the observations I made, upon being let down into it, in June last, at the time I was at Buxton-wells. If you think it any way curious, as a new account, you will be pleased to communicate it to the Royal Society.

I am, Dear Sir,

Your much obliged

humble servant,

Soughton in Flintshire,
August 4, 1770.

J. Lloyd.

A De-

A Description

of ELDEN HOLE, in DERBYSHIRE.

HAVING often heard, and seen, several accounts of the unfathomable depth of Elden Hole, in Derbyshire, and being in that neighbourhood, I was inclined to make what enquiries I could about that noted place, of the adjoining inhabitants; who informed me, that about fourteen or fifteen years ago, the owner of the pasture in which this chasm is situated, having lost several cattle, had agreed with two men for to fill it up; but they, finding no visible effects of their labour, after having spent some days in throwing down many loads of stones, ventured to be let down into it, to see if their undertaking was practicable; when upon finding at the bottom a prodigious large cavern, they desisted from their work, as it would have been almost impossible to have procured a sufficient quantity of stones to have filled it up.

Upon enquiry of one of these men whether there were any damp's at the bottom; and being assured in the negative; I procured two ropes of forty fathom nearly in length, and eight men to let me down.

As the entrance is so well known, I shall say nothing further of it, than merely, that it lies near North and South in its direction lengthways; and that the opening from one of those points to the other, at

the surface, is about thirty yards, and eight or nine yards broad.

For the first twenty yards I was let down (which was at the South side), I could assist myself with my hands and feet, as it was a kind of confined slope; but after that, the rock jetted out into large irregular pieces, on all the three sides next me; and on that account I met with some difficulty in passing, for about the space of ten yards more; at which depth the rope was moved at least five or six yards from the perpendicular. Thence down, the breadth was about three yards, and the length at least five or six, through craggy irregular slits in the rock, which was rather dirty, and covered with a kind of moss, and pretty wet, until I came within about twelve or fourteen yards of the bottom, and then the rock opened on the East side, and I swung, till I descended to the floor of the cave, where I perceived there was light enough came from the mouth of the pit (though at the distance of sixty-two perpendicular yards) to read any print. When I was at the bottom, I perceived that the cavern consisted of two parts; the first (into which I descended, at the place I began to swing) being a cave, in shape not much unlike to that of an oven; and the latter, a vast dome of the form of the inside of a glass-house; with a small arched passage from the one to the other, through which a slope of loose stones (that have been thrown in from time to time) extends from the wall at the West side of the first dome, to almost the bottom of the second cave, or dome, with such an angle, that the further end of the cave is lower by twenty-five yards, than the place where I first landed.

The

The diameter of this cavern I take to be nearly fifty yards : the top I could not trace with my eye ; but had reason to believe it extended to a prodigious height ; for, when I was nearly at the top of one of the incrusted rocks, at the height of (I dare say) twenty yards, I could find no closure of the dome, though I then saw much further than when I stood at the bottom.

As to the particular curiosities to be met with in the small cavern, they are not worth mentioning ; indeed I did not meet there with any stalactitical incrustations whatsoever ; but the wall consisted of rude and irregular fragments of rock.

Amongst the singularities in the second cavern, I particularly observed the following ; climbing up a few loose stones on the South side, at the place marked Q. (in the plan fig. II.), I descended again, through a small slit, into a little cave, four yards long, and irregular, as to height not exceeding two yards ; and the whole lined with a kind of sparkling stalactites, of a fine deep yellow colour, with some small stalactitical drops hanging from the roof.

Facing the first entrance is a most noble column, of the same kind of incrustation (see D. fig. II. and IV.) which I could perceive to be above thirty yards high : and proceeding on to the North, I came to a large stone (marked E. fig. II. and IV.) covered with the like matter ; and under it I found a hole two yards deep, lined with the same ; from whence sprung a rock consisting of vast solid round masses, like the former in colour, though not in figure, on which I easily ascended to the height of twenty yards, and got some fine pieces of stalactites, pendent from the cragged sides which joined this rock. At the upper part I

I

perceived

perceived a small hole, or cleft; but could not, without being in danger of my life, get at it; and I found great difficulty in coming down again.

After this, proceeding forward, I came to another pile of incrustations, different from the two former, and much rougher; and which was not tinged with such a yellow, but rather with a brown colour; and at the top of this also is a small cavern, into which I went.

The last thing I took notice of was the vast drops of stalactites, hanging like icicles from every part of the vault; some of which were as large as a man's body, and at least four or five feet long.

I observed the greatest part of the walls of the large cavern was lined with incrustations, and that they were of three kinds: the first, being the deep yellow stalactites; the second, being a thin coating, like a kind of light stone-coloured varnish upon the surface of the limestone, and which glittered exceedingly by the light of the candles; and the third being a sort of rough efflorescence, every minute shoot resembling a kind of rose-flower.

Having satisfied my curiosity with a view of this astonishing vault, I began to return (observing the whole floor to be covered with vast quantities of loose stones); and reascending that heap, which I first mentioned, and so returning through the arch which separated the two vaults, I perceived, that though it is now only about three yards high, yet it must formerly (before the stones were flung in), have been a very magnificent entrance.

Once more fastening the rope to my body, I gave the signal to be drawn up, which I found to be a much more difficult and dangerous task than my descent,

descent, owing to my weight drawing the rope into clefts, betwixt the fragments of the rock, which made it stick; and to my body jarring against the sides, which I could not possibly prevent with my hands. Another circumstance also increased the danger, which was, the rope loosening the stones over my head, whose fall I every instant dreaded. As I was obliged to keep my face towards the side on which I was let down, I could not make any very particular observations on either of the rocks on each side of me, nor any whatsoever on the opposite one, except at a few resting places, either in my descent or ascent.

For the sake of conveying a clearer idea of the description, I have added two or three drawings, and a plan; which are as exact a resemblance of the place, as my recollection will enable me to give.

And, before I conclude, I ought to mention, that under the projection of the rock at A (fig. I.) where the passage first grows narrow, and which may with difficulty be seen from the top, is the entrance of a cavern, that seems to go a great way; but I could not get into it, and therefore am not able to say any thing further about it.

P. S. Since writing the above, I have been informed, that a gentleman, who lives near the spot, affirms, there was formerly the mouth of a second shaft in the floor of the great cavern, somewhere under the great heap of stones; and that it was covered up by the miners, at the time when so many loads were thrown in from the top. It is reported to have gone down a vast depth further, and to have had water at
the

the bottom ; but I did not perceive any remaining appearance of such opening myself, nor did the miners, who went down with me, say any thing about it.

To Doctor Maty, Sec. R. S.

S I R,

Bedford-Row, Sept. 1, 1770.

I Have taken the liberty to send you, in consequence of Mr. Lloyd's request, his curious and exact account of Elden Hole in Derbyshire: and I hope it will not be thought improper, if I venture to add a few short observations upon it.

Mr. Lloyd, in his postscript, mentions the report of there being a second shaft, at the bottom of the great heap of stones: and when I was myself in Derbyshire, about four years ago, and went to view the spot, I had an opportunity of receiving some information, from the wife of one of the miners, who had been down; and she described the cavern in a manner agreeable to such an account: for she mentioned a very steep shelf, or descent, in the midway; at the bottom of which (she said) her husband went down again a great way further, till he came to some water.

I do therefore conclude, that there really is such a second shaft; which having been covered up with
large

large flag stones, or timber (probably by the miners) to facilitate, if possible, the filling up of Elden Hole, still remains buried under the heap of stones. And I do also suppose, that the great slope of stones, which Mr. Lloyd describes, is not entirely composed of loose stones from time to time flung in; but that under them is the original shelf of solid rock, much steeper than the present slope, and something in the direction S D fig. V. with the mouth of the second shaft near the end of it. And this supposition, together with Mr. Lloyd's exact description of the parts of the cavern which he saw, will perhaps reconcile all the accounts that have been given of this most astonishing chasm.

For, stones flung down, or let down by ropes, in a proper direction, would certainly slide along the shelf of rock, and descend into the second shaft, before it was covered up; whereas others would rest at the bottom of the first shaft, or in the great cave: and hence the depths observed by different persons, at different times, must have varied greatly from one another.

And if it be further considered, that, in sounding such great depths, the weight of the rope may often be mistaken for the weight of the plummet; and that hence the rope may continue descending, and coiling up, first at the bottom, and afterwards at other places where it is accidentally stopped, till it be at length hindered in its descent by some projections of the rock nearer the mouth of the shaft; this will account for Mr. Cotton's letting down 884 yards; whilst the water at the bottom of the second shaft will account for 80 yards being wet; as so many

might coil up in the water (let it have been ever so shallow), and as the rest, beyond the real depth of the chasm, might coil up either in the great or little cave.

Again, the many craggs on each side the first shaft, (and probably also on each side the second) must retard any stone in its fall; and by that means will account for the length of time a body takes in descending; which must be a great deal longer than if it fell in open space: and hence Dr. Short (who has given us a calculation, formed from the time of the descent of heavy bodies, according to the Newtonian principles of gravitation) was misled to conclude, though very ingeniously, that this chasm was 422 yards deep.

And lastly; the falling of stones into the water, at the bottom of the second shaft, and the increase of the sound made thereby, partly from the reverberation at the sides of the great cavern, and partly from the form of the upper shaft (which is not very unlike that of a speaking trumpet, see fig. I.) might occasion that astonishing noise, which is said to have been heard at various times formerly, on throwing stones into this gulph; but which has not been heard of late years, in a manner at all agreeable to old reports.

And now, Sir, I cannot forbear to take notice, that as both Mr. Lloyd, and also the miner's wife, from whom I had my information, mentioned there being water at the bottom of the second shaft, it appears highly probable, that this water is the continuation of a subterraneous river; and indeed of that very river which runs out of the mouth of the great cavern.

cavern at Castleton : for it is observed by the country-people in the neighbourhood, that there is a large quantity of grit stone grows in the earth near Elden Hole, but none near Castleton ; and yet, on high floods, the river at Castleton washes great quantities of fragments of that very grit-stone, out of the mouth of Castleton cavern.

There is also a tradition, which, however ridiculous it appears at first sight, ought to have some little weight ; especially if compared with what Keyser and Dr. Brown * relate of the Zirchnitzer sea in Car-niola. The tradition is this, that many years ago, a poor old woman, hunting her goose, it fled from her, and at last fell down into Elden Hole, to her great sorrow ; but some days after, she heard it was seen at the mouth of Castleton cavern, and actually received it safe again from thence : the goose having, by the fluttering of its wings, preserved itself from being dashed to pieces in its fall ; and having found its passage safely through the subterraneous river.

I have added these few observations, for the sake of preserving the tradition concerning the second shaft, which otherwise perhaps would very soon be lost ; and also for the sake of shewing how great a probability there is of its being true : and to explain the matter more fully, I have ventured to add a fifth drawing, though merely from conjecture.

But before I conclude, I must beg leave to observe, that the disposition of the masses of stalactites in this cavern, seems to me to deserve some attention. Of the three great piles of incrustations, two manifestly

* See Keyser's Travels 8vo. Vol. IV. p. 140, and Lowthorp's Abridgement of the Philosophical Transactions, Vol. II. p. 306.

descend from two chasms (H and G fig. IV.) in the sides of the cavern ; and therefore seem to have been formed by the water draining, and dripping at times, through those chasms, and carrying with it the stalactitical matter : and it is remarkable that the pile (I, Fig. IV.) from the larger chasm, is coarser, and rougher, and of a more earthy colour, than that from the smaller chasm. But the third and largest column of stalactites, (D, Fig. IV.) has no chasm in the rock at its top ; and is of a finer kind than the two others ; and consists of perpendicular spires ; whereas the others consist of large mis-shapen lumps. And it is most remarkable, that this stands very near the end of the slope of stones ; and consequently, that somewhere near it must be the mouth of the second shaft, if such really exists.

As therefore Dr. Browne, in his travels (p. 96, 4to.) mentions stalactites formed on the irons in the cupola of the baths at Buda, by the *exhalations* from the baths ; and as so many of the waters in Derbyshire are warm, and mineral ; I would beg leave to submit it to the consideration of the curious, whether this column, in particular, and the thin coating of stalactites, on all the walls of the great cavern, mentioned by Mr. Lloyd, were not most probably formed by *exhalations* from the second shaft ; whilst the other two columns, and the stalactites pendent from the roof, were formed by water and stalactitical matter transuding through the chasms above-mentioned, and through the pores of the stone ? I am, Sir,

With great respect, your much obliged,
and most obedient humble servant,

Edward King.

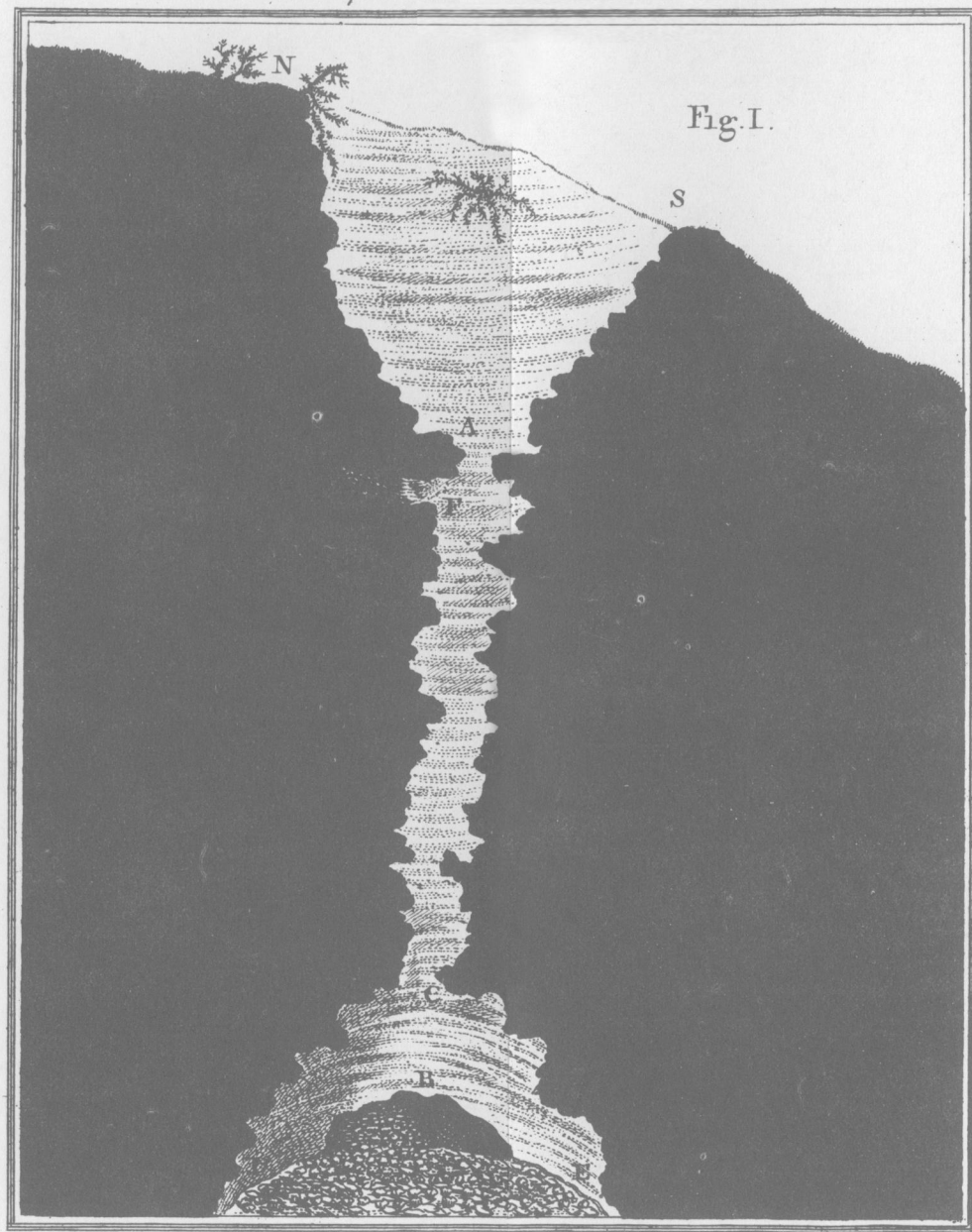
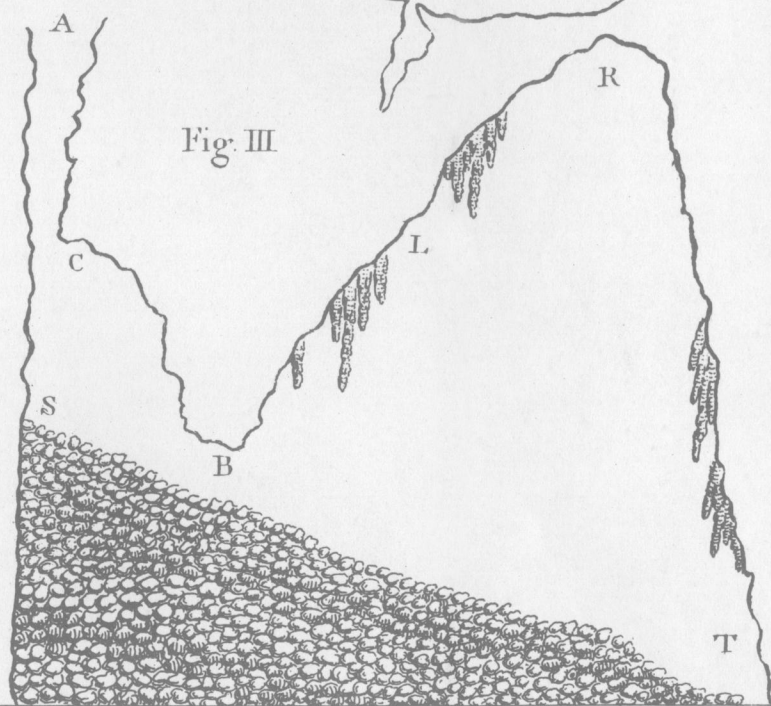
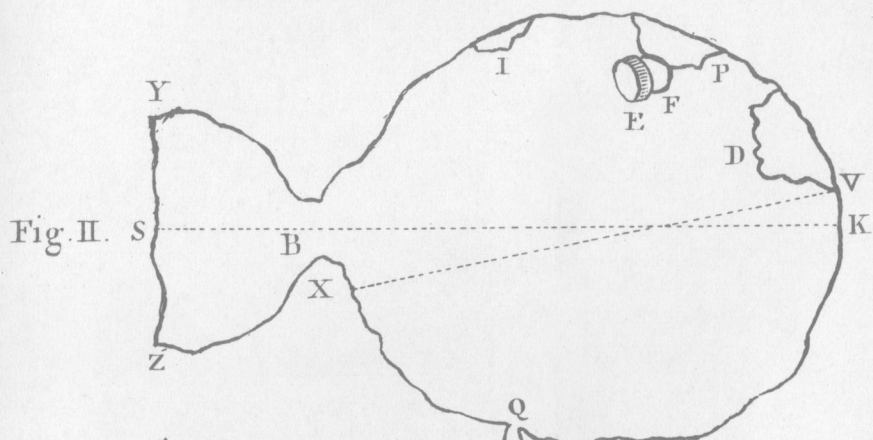


Fig. II.



Explanation of PLATE VIII.

Fig. I.

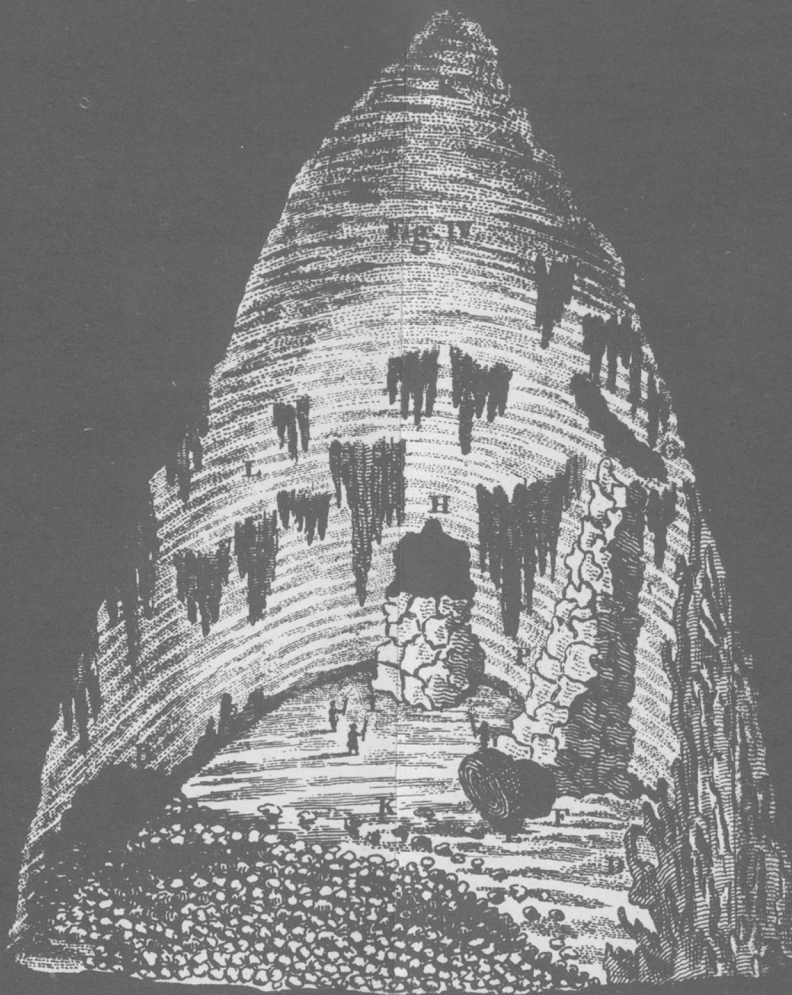
A Section of the Great Shaft, and First Cave.

- NS The mouth of the Chasm lengthways from North to South.
- S The South end, at which I was let down.
- A The first great cragg, where the passage grows narrow. Opposite to it is a large projection of the rock, which may be just seen from the top: and under that is,
- F The entrance of a cavern, which seemed to go a great way; but I could not get into it.
- C A large projection of the rock at the bottom of the shaft. As soon as I had passed this, I swung; being come into the first Cave.
- DE The heap of stones, with which the whole bottom of the first cave is filled.
- B The arched passage into the great vault, being about three yards high.

Fig. II.

The Plan of the Caves:

- YZB** The floor of the first cave. **Y** The North end. **Z** The South end.
- YZ** The flat wall of rock, on the West side.
- B** The entrance into the great cavern, on the East side.
- BXQKVPI** The floor of the great cavern.
- Q** A little, narrow, irregular cave.
- D** The base of a column of stalactites, above 30 yards high.
- P** The base of the rock of more solid and round masses of stalactites.
- E** The great stone, which covers part of the mouth of
- F** A pit, or hole, two yards deep, lined with yellow stalactites like stucco.
- I** The base of a pile of encrusted stones, which lead up to a small cave.
- SK** The direction of the section fig. III.
- XV** The direction of the section of the great cavern, fig. IV.



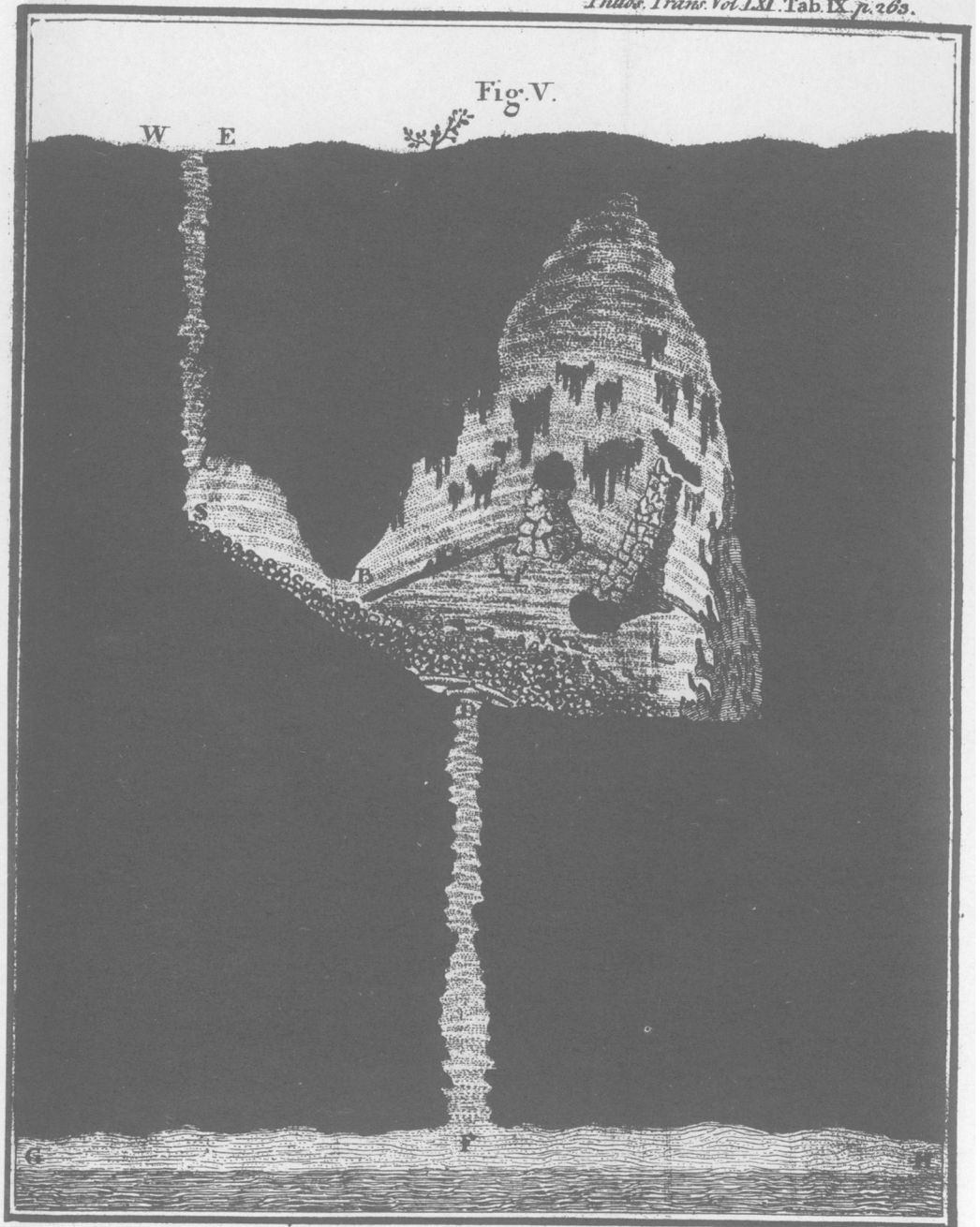


Fig. III.

- AC The shaft where I was let down.
- C The place where I began to swing, in the small cave.
- AS The perpendicular wall of rock on the West side.
- B The entrance into the great cavern on the East side.
- RT The great Vault or Dome.
- ST The heap of stones, which have been flung in from time to time.
- I Large drops of stalactites, in clusters.

Explanation of PLATE IX.

Fig. IV.

The inside of the great Cavern.

- B The entrance on the West side.
- K The continuation of the vast heap of stones.
- D The column of stalactites, above 30 yards high.
- E The great stone which covers part of the mouth of

F A

- F A pit or hole, two yards deep, lined with stalactites like stucco.
- P The rock of more solid and round masses of stalactites, on which I ascended about 20 yards.
- G A cleft in the rock at the top of the pile.
- I A pile of incrusted stones, which leads up to a small cave H.
- L Large drops of stalactites, hanging in large clusters.
- R The roof (probably somewhat of this form) but too high to be seen.

Fig. V.

A View of all the Caverns, with the second Shaft.

- WE The mouth of Elden Hole. W The West side. E The East.
- C The entrance into the lesser cave.
- B The passage into the great cavern.
- R The roof of the great cavern, reaching nearly to the surface of the ground.
- ST The slope formed by the heap of stones.
- SD The steep shelf of rock, probably, under it.
- D The mouth of the second shaft, which very probably still exists; but is covered up, somewhat in the manner here represented.

- F The bottom of the second shaft.
- GH A subterraneous river, at the bottom of the second shaft; which probably communicates with some of the rivers in that great cavern at Castleton: a circumstance there is reason to suspect, from hence, that those rivers, on great floods, are observed to cast up small fragments of a kind of grit stone, which grows plentifully in the parts of the country near Elden Hole; but is not to be found in the parts near the cavern at Castleton.